NSVT. When the final beat initiated by reentry, NSVT terminated because of conduction block or changes in the sequence of activation along the reentrant pathway. When the final beat initiated by a focal mechanism, based on the absence of intervening electrical activity from the termination of the previous beat, NSVT terminated because of sudden cessation of electrical activity from the initiation site. Thus, the termination of VT in patients with ischemic heart disease is due to alterations in both reentrant and focal excitation.

929-56 Effects of Propafenon on Anisotropic Conduction in Individual Muscle Layers of the Intact Canine Heart

Alexander Bauer, Kirsten D. Freigang, Frederik Voss, Ruediger Becker, Julia C. Senges, Johannes Brachmann, Wolfgang Schoels. *University of Heidelberg, Germany*

The effect of antiarrhythmic drugs on impulse propagation in the intact heart might depend on fiber orientation and action potential characteristics in individual muscle layers. This study was designed to determine the effects of propafenone (PROP) on local conduction properties in relation to fiber orientation and location within the ventricular wall. In 4 normal dogs, 8 parallel rows of 6 needle electrodes (10 mm in length, 4 bipolar electrodes per needle, interelectrode distance 2 mm, distance between needles 5 mm) were inserted into the anterior left ventricular wall, perpendicular to the left anterior descending artery, that is, along the long axis of epi- and endocardial fibers and along the short axis of midmyocardial fibers. Using a computerized multiplexer-mapping system, 192 electrograms were simultaneously recorded to reconstruct the spread of activation during constant pacing at a cycle-length of 200 ms before (CON) and after application of 2 mg/kg PROP intravenously. Conduction velocities (CV) parallel (longitudinal) and perpendicular (transverse) to fiber orientation were calculated for the epi- (EPI), endo- (ENDO) and midmyocardial (MID) muscle layer. Absolute values for CV before (CON) and after PROP and relative changes (∂CV) induced by PROP are summarized in the table below.

	CON-lo	CON-tr	PROP-lo	PROP-tr	∂cv lo	∂cv tr
Epi	1.3 ± 0.1*	1.0 ± 0.1	0.9 ± 0.1	0.9 ± 0.1	0.4 ± 0.2#	0.1 ± 0.1
Mid	1.1 ± 0.2*	1.5 ± 0.3	0.9 ± 0.1*	1.0 ± 0.1	0.4 ± 0.2#	0.1 ± 0.1
Endo	1.3 ± 0.2*	1.1 ± 0.3	1.0 ± 0.1	1.1 ± 0.1	0.4 ± 0.1#	0.1 ± 0.2

*p < 0.05 longitudinal (lo) vs transverse (tr), #p < 0.05 CON vs PROP.

Conclusions: Throughout the ventricular wall, PROP reduces CV more markedly in longitudinal than in transverse direction of the fibers. The decrease of directional differences in conduction might represent one mechanism of antiarrhythmic drug action, as potential prerequisites for anisotropic reentry are being abolished.

929-57 Electrophysiological Properties of Individual Muscle Layers in the in Vivo Canine Heart

Kirsten D. Freigang, Ruediger Becker, Alexander Bauer, Frederik Voss, Julia Senges, Johannes Brachmann, Wolfgang Schoels. *University of Heidelberg, Germany*

Based on in vitro studies, different electrophysiological properties have been described for epi-, endo- and midmyocardial layers of normal ventricular muscle. The relevance of these findings for the situation in vivo is still unclear. Following radiofrequency ablation of the AV node, 60 pin electrodes (1 cm in length, 4 bipolar electrodes per pin, interelectrode distance 2 mm) were inserted into the left (LV) and right (RV) ventricle (distance between pins 5–10 mm) of 5 normal dogs. Using a computerized mapping system, three-dimensional activation maps of both ventricles and two-dimensional activation maps of individual muscle layers (2, 4, 6 and 8 mm in depth) during ventricular pacing at a cycle-length of 600 ms were reconstructed from 240 or 60 simultaneously recorded electrograms, respectively. Activation times (AT) for individual layers were calculated on the basis of the activation map. Local effective refractory periods (ERP) at 64 ± 8 randomly selected sites were determined with the extrastimulus technique (basic cycle length 1000 ms). The difference between the longest ERP and the shortest ERP was defined as dispersion (DISP) of ERP.

There was no marked difference in the general activation pattern of individual muscle layers. Data on AT and local ERPs for individual muscle layers (1–4) of both ventricles are summarized in the table (basic cycle length 1000 ms).

	AT ms		DISP		ERP ms	
	LV	RV	LV	RV	LV	RV
1	56 ± 11	60 ± 13	24 ± 5	30 ± 13	216 ± 15	220 ± 23
2	60 ± 14	62 ± 9	31 ± 13	32 ± 19	214 ± 21	217 ± 25
3	65 ± 12	57 ± 9	28 ± 15	21 ± 16	212 ± 20	214 ± 24
4	59 ± 14	54 ± 5	25 ± 21	29 ± 5	214 ± 18	219 ± 23

Conclusions: In the normal in vivo canine heart, individual muscle layers seem to exhibit relatively uniform electrophysiological properties. Thus, transmural gradients of conduction or refractoriness facilitating reentry are unlikely to occur.

929-58 Magnetic Resonance Imaging in Adenosine-Sensitive Ventricular Tachycardia

Steven M. Markowitz, Bonnie L. Litvak, Elizabeth A. Ramirez de Arellano, John A. Markisz, Kenneth M. Stein, Bruce B. Lerman. *New York Hospital — Cornell Medical Center, New York, NY*

Adenosine-sensitive ventricular tachycardia (VT) is thought to be due to cAMP mediated triggered activity. It typically originates from the RVOT and is associated with apparently nl hearts. Using MRI, we tested the hypothesis that RVOT tachycardia occurs in pts without structural heart disease.

Results: 12 pts (age 45 ± 18, range 7–65, 7 F) presented with sustained VT (5), or repetitive monomorphic VT (7). Morphology was LBBB in 10 and RBBB in 2. All pts had inducible VT that was identical to clinical tachycardia and mapped to the RVOT in 6, RV apex in 1, and septal LV outflow tract in 3. VT was sensitive to adenosine (12/12), vagal maneuvers (9/10), and verapamil (7/9). Echocardiography was nl in 8/9 and revealed MVP in the other pt. Cardiac angiography and left ventriculography were nl in 5/5. Gated MRI with cine images was nl in 5/12. Abnormalities in the remaining 7 pts included focal thinning of the RV free wall or apex (5), regional dyskinesis (3), and fatty infiltration of the RV free wall or septum (4). There was a poor correlation between location of abnormalities by MRI and the site of origin of VT. MRI scans in age and sex matched controls were normal.

Conclusion: 1) Pts with VT due to cAMP-mediated triggered activity may comprise a heterogeneous group as assessed by MRI. 2) Fatty infiltration of the RV is not a specific finding for arrhythmogenic RV dysplasia. 3) The significance of these structural abnormalities is uncertain since they often do not correspond to the site of VT origin.

929-59 Dissociation Among Indices of Sympathetic Nervous System Tone at the Sinus Node, Ventricular, and Peripheral Levels

Thomas Kong, Jeffrey Goldberger, Jerry Weiss, Michele Parker, Alan Kadish. *Northwestern University Medical School, Chicago, IL*

We have previously shown that circadian variation in ventricular refractoriness (VERP) is abolished by β blockade, and thus the magnitude of VERP can serve as an index of ventricular β adrenergic tone. To examine the relationship among indices of β adrenergic tone at the sinus node, ventricular and peripheral levels, 5 subjects with permanent pacemakers and normal LV and sinus node function underwent hourly measurement of VERP non-invasively, heart rate variability (HRV) and plasma epinephrine (Epi) and norepinephrine (Norepi) levels over 24 hours. Sinus node sympathetic tone was estimated by spectral analysis of HRV (low to high frequency power ratio; LF/HF), and VERP was normalized. Separate regression analyses were performed for each pair of dependent–independent variables and including in addition variables coding for repeated measures in each subject. R^2 values are shown for each analysis model (including the coding variables) and p values are shown for each dependent-independent variable pair. *Results:*

Dependent variable	Independent variable	R^2	p value
VERP	Epi	0.24	< 0.0001
	Norepi	0.33	0.001
	LF/HF	0.23	0.007
LF/HF	Epi	0.27	0.0005
	Norepi	0.18	0.99

Conclusions: 1) Indices of sympathetic tone at various levels of the cardiovascular system are significantly but weakly correlated suggesting regional differences in the magnitude of sympathetic outflow/effect 2) Extrapolation of the magnitude of β adrenergic tone from one level to another may not be appropriate in all circumstances.

929-60 Effect of Flecainide on Endocardial Activation in an Intact Canine Model Using Non-Contact Unipolar Electrograms

Stuart W. Adler, Jeffrey R. Budd, Brian D. Pederson, Charles C. Gornick. *University of Minnesota and VAMC, Minneapolis, MN*

The class 1c drug flecainide (FLEC) produces conduction slowing in cardiac tissue. The regional effects of the drug have been measured on the epicardial surface or from limited endocardial locations. However, no previous studies have examined the effect of FLEC on global LV endocardial activation (ENDACT) in the intact heart.